I.S.S.N: 1885-6888

ECONOMIC ANALYSIS WORKING PAPER SERIES

An Exploration of the Content of Social Norms using Simple Games

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Working Paper 1/2010

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DEPARTAMENTO DE ANÁLISIS ECONÓMICO:
TEORÍA ECONÓMICA E HISTORIA ECONÓMICA

An exploration of the content of social norms using simple games

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December 14, 2009

Abstract

The literature on social norms stresses that compliance with norms is approved while deviance is disapproved. Based on this, we explore the content of social norms using experimental data from five dictator games with a feedback stage. Our data suggests that subjects either care about a reciprocity or an efficiency norm.

Keywords: Approval, Disapproval, Dictator Game, Experiment, Social Norms.

JEL-Numbers: A13, C72, D64, Z13.

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1 Introduction

Much of the existing literature on social norms emphasizes that norms are partly sustained by the approval and disapproval from others (Elster 1989), which suggests that social norms might be elicited by studying what people approve/disapprove (Krupka and Weber 2008). With this idea in mind, this paper uses data from five dictator games to explore the distribution and content of social norms. Applying the classification analysis from El-Gamal and Grether (1995), we observe that people are heterogeneous with respect to their approving/disapproving behavior. Further, the best theory (in terms of parsimony and empirical relevance) distinguishes two groups: Some subjects disapprove choices that harm them, while others disapprove inefficient choices. Our study is also related to an increasing literature on non-monetary sanctions/rewards (see, for instance, Masclet et al. 2003, Rege and Telle 2004, Noussair and Tucker 2005, Ellingsen and Johannesson 2008, and Xiao and Houser 2008).

The rest of the paper is organized as follows: Section 2 describes the experimental design, section 3 reports some aggregate statistics, the classification analysis is performed in section 4, and section 5 concludes.

2 Experimental Design and Procedures

We consider five binary dictator games in which the dummy has the possibility to express her/his opinion about the dictator's choice. Hence, each dictator game consists of two stages. First, the dictator chooses between two payoff allocations, which differ across games. We employed the following ECU allocations (20 ECU = 1 Euro), where the first number in a parenthesis indicates the dictator's payoff:

1. $(180, 140)$ and $(100, 220)$

2. $(180, 120)$ and $(100, 100)$

3. $(240, 120)$ and $(100, 120)$

4. $(180, 120)$ and $(120, 180)$

5. $(200, 120)$ and $(160, 160)$

In the second stage, the dummy can send a closed-form, costly message (for a 10 ECU fee) to the dictator. To implement this, we employed the strategy method. That is, for each allocation of each dictator game, the dummy is first asked whether she/he wants to pay the message fee. Afterwards, and independently of her/his prior answer, the dummy is asked which of the following three messages she/he would like to send had she/he paid the fee: "Your choice was (1) good, (2) neither good nor bad, (3) bad." Of course, the message is delivered only if the dummy decided to pay the fee at the allocation actually chosen by the dictator. This method maximizes the amount of statistical evidence and prevents order effects in our series of five games. In effect, since subjects are provided no information about other players' choices, we can expect no variation in their emotional mood across games (the games were presented one at a time).

We conducted the experiment, which was programmed using z-Tree (Fischbacher 2007), in the computer laboratory at Maastricht University. In total, 180 subjects participated in our study (most of them were students from the Faculty of Economics and Business Administration). Since this experiment is rather short, we implemented it together with another experiment on the prisoner's dilemma (PD) game, which consisted of three different treatments and whose results are reported in another paper. More precisely, after the PD finished, subjects received instruction sheets (in neutral language) explaining the general structure of the dictator games (without giving information about payoff constellations), were assigned a fixed role (dictator or dummy), and were re-matched with another participant for the five games (all this was common knowledge). To insure that the PD does not affect behavior in the dictator games, subjects were not informed of the results from the PD. In order to prevent income effects only one game (among the PD and the five dictator games) was randomly selected for payment. At the end of the experiment, subjects were informed about their co-player's actions in the payoff-relevant game. The average payment of the 45 minutes session was about 9 Euro.

3 Aggregate Statistics

Table 1 provides an overview of the hypothetical messages that the dummies sent to their co-players.[1] We observe that in each game, one allocation receives mostly disapprovals whereas the alternative allocation receives mostly approvals. This suggests that dummies tend to follow some common rule, a point that we study in detail later.

	Game			Hypothetical Messages	
	Left-Hand		Right-Hand	Left-Hand Allocation	Right-Hand Allocation
1	(180,140)	vs.	(100,220)	0.2778 [0.4000]	0.7333 [0.1667]
2	(180,120)	vs.	(100,100)	0.6889 [0.1333]	0.1556 [0.6444]
3	(240,120)	vs.	(100,120)	0.6222 [0.1667]	0.2000 [0.5444]
4	(180,120)	vs.	(120,180)	0.1778 [0.4556]	0.6222 [0.1667]
5	(200,120)	vs.	(160,160)	0.2000 [0.5444]	0.7333 [0.1222]

Table 1: Approval [Disapproval] rates of the dummy player in the five dictator games using hypothetical messages.

Table 1 refers to hypothetical messages. To actually send a message, however, the dummy had to pay a fee, which allows us to check whether hypothetical messages were chosen ran-

[1]Since the behavior in the dictator games does not vary substantially across the PD treatments, we decided to pool the data.

domly. Overall, the fee was paid in about 8.67 percent of all possible cases, and 44 (29) messages approved (disapproved) the corresponding dictator's choice. In general, actual messages fit similar patterns than hypothetical ones: The dummy always approved the dictator in case she/he picked the right-hand allocation in the first, fourth, and fifth game (13, 9, and 5 times, respectively), while taking the left-hand allocation in games 1 or 2 and taking the right-hand allocation in game 2 was disapproved most often (6, 5, and 7 times, respectively).

Our games were mainly designed to study disapproval, and not the dictators' behavior. However, we note that dictators chose almost always the allocation that maximized their own payoff. More precisely, the payoff-maximizing allocation was chosen with probability 0.9888 in the first game, with probability 0.94444 in the second, with probability 1.0000 in the third, with probability 0.9888 in the fourth, and with probability 0.81111 in the fifth game.

4 Classification Analysis

Next, we apply the classification procedure from El-Gamal and Grether (1995) to analyze the motives behind the dummies' disapproval. More precisely, we posit that dummies follow deterministic decision rules when disapproving (the rules may differ from subject to subject), but also that they deviate with probability $\varepsilon > 0$. This classification procedure has several favorable attributes. By selecting the decision rule that best fits each subject's behavior, we can classify subjects in types. It also helps us find the best single decision rule, or the combination of two, three, etc. decision rules that best account for the behavior in our dictator games. Given this, we can then apply the Akaike Information Criterion to infer the number of decision rules necessary to provide an accurate but parsimonious explanation of the pattern of disapproval in our games. Importantly, the procedure circumvents the multicollinearity problems that would appear in a classical regression analysis if the decision rules entered as independent variables and allows appropriate inferences even when testing all possible decision rules –no matter how similar their predictions are– at the same time.

4.1 Individual Decision Rules

For simplicity, we restrict our analysis to binary rules; that is, rules indicating whether the subject disapproves (without specifying what happens if the subject does not disapprove). Our selection of five dictator games allows us to test seven rules that seem especially appealing. Letting (x_1^L, x_2^L) refer to the left-hand and (x_1^R, x_2^R) to the right-hand allocation at any of our dictator games (1 denotes the dictator and 2 the dummy), they are defined as follows:

1. The *no-disapproval rule* never predicts disapproval;

2. the *envy rule* predicts disapproval at allocation $i \in \{R, L\}$ if, and only if, $x_1^i > x_2^i$ –that is, if the dictator gets a larger payoff than the dummy;

3. the *reciprocity rule* (see Holländer 1990) predicts disapproval at allocation $i \in \{R, L\}$ if, and only if, the alternative allocation $j \neq i$ is such that $x_2^i < x_2^j$ –that is, if the dummy was harmed by the choice of the dictator;

4. the *spite rule* predicts disapproval at all allocations;

5. the *efficiency rule* predicts disapproval at allocation $i \in \{R, L\}$ if, and only if, $x_1^i + x_2^i < x_1^j + x_2^j$, where $j \neq i$ –that is, subjects disapprove socially inefficient choices;

6. the *equity rule* predicts disapproval at allocation $i \in \{R, L\}$ if, and only if, $|x_1^i - x_2^i| < |x_1^j - x_2^j|$, where $j \neq i$ –that is, subjects disapprove inequitable choices; and,

7. the *maximin rule* predicts disapproval at allocation $i \in \{R, L\}$ if, and only if, $\min\{x_1^i, x_2^i\} > \min\{x_1^j, x_2^j\}$, where $j \neq i$ –that is, subjects disapprove deviations from a maximin or

Rawlsian norm.

Table 2 presents the predictions of the non-trivial rules in the five dictator games.

	Game			Predictions of Disapproval	
	Left-Hand		Right-Hand	Left-Hand Allocation	Right-Hand Allocation
1	(180,140)	vs.	(100,220)	EN, RE	EQ, MA
2	(180,120)	vs.	(100,100)	EN, EQ	RE, EF, MA
3	(240,120)	vs.	(100,120)	EN, EQ	EF, MA
4	(180,120)	vs.	(120,180)	EN, RE	
5	(200,120)	vs.	(160,160)	EN, RE, EQ, MA	

Table 2: Predictions of disapproval in the five dictator games. The following notation is used: EN=envy, RE=reciprocity, EQ=equity, EF=efficiency, MA=maximin.

4.2 Methodology

Let D be the set of all dummies (of cardinality n), S be a set of k ($k = 1, 2, ..7$) of the above mentioned rules, and $f^* : D \to S$ be a mapping that assigns every dummy d to the rule in S that fits best the disapproving behavior of d in the dictator games. That is, if $X_d(S)$ denotes the maximum number of times that dummy d follows a rule in S, this mapping assigns each dummy to the corresponding rule in S –in case of a tie, the dummy is "divided" equally among the tied rules. Observe that mapping f^* induces a partition of D in k sets $\{D_i(S)\}_{i=1}^k$.

No *model* (S, f^*) is likely to replicate perfectly the dummies' actual behavior and we must allow for some error. More precisely, we posit that every dummy deviates from her corresponding rule at each allocation with probability $\varepsilon > 0$. Therefore, the probability that dummy d follows her rule X_d times out of her 10 choices is $(1-\varepsilon)^{X_d} \cdot \varepsilon^{10-X_d}$, and the probability that our data is generated by model (S, f^*) equals:

$$\prod_{i=1}^{k} \prod_{d \in D_i(S)} (1-\varepsilon)^{X_d(S)} \cdot \varepsilon^{10-X_d(S)}. \tag{1}$$

Given this, one can show by standard optimization techniques that the maximum likelihood estimation of the error rate for the model (S, f^*) coincides with the proportion of overall deviations:

$$\hat{\varepsilon} = \frac{10 \cdot n - \sum_{d=1}^{n} X_d(S)}{10 \cdot n}.$$

Observe that for any two models (S, f^*) and (T, f^*) such that $S \subset T$ it is necessarily the case that $\hat{\varepsilon}_T \leq \hat{\varepsilon}_S$. However, model (T, f^*) is more complex than (S, f^*) and it is hence sensible to introduce a penalty for allowing too many decision rules in a model. For this, we use the Akaike Information Criterion (AIC), according to which the best model (S^*, f^*) should maximize the log-likelihood minus the number of parameters $(10 + n) \cdot k$.

4.3 Results

Table 3 presents the results of the classification analysis.

It can be seen that if we consider models with just one rule (i.e., all dummies are of the same type), the efficiency rule describes behavior best, followed by the reciprocity and the no-disapproval rule. If we consider models with two types of dummies, the best model has an estimated error rate of 0.19 and includes the efficiency and the reciprocity rules (49 subjects are assigned to the efficiency and 41 subjects to the reciprocity rule). Overall, this is the best model in terms of parsimony and accuracy, as it maximizes the Akaike information criterion (-637.60). In other words, our analysis suggests that disapproval in our dictator games is mainly triggered by inefficient choices but also harming ones.

5 Conclusion

Our analysis indicates that subjects are heterogenous regarding their disapproving behavior, and we identify two main norms: One commends not to harm others, while the other

Model			Error Rate	AIC	Assignment of Subjects		
Efficiency			0.2967	-647			
Reciprocity			0.3256	-668			
No-disapproval			0.3344	-674			
Maximin			0.3544	-685			
Envy			0.4944	-724			
Equity			0.5322	-722			
Spite			0.6656	-764			
Efficiency	Reciprocity		0.1900	-638	49 EF	41 RE	
No-disapproval	Reciprocity		0.2122	-665	46 ND	44 RE	
Efficiency	Envy		0.2177	-672	53 EF	27 EN	
Reciprocity	Maximin		0.2388	-695	49 RE	41 MA	
Efficiency	No-disapproval		0.2455	-702	53 EF	37 ND	
Reciprocity	Efficiency	No-disapproval	0.1566	-690	35 RE	33 EF	22 ND
Efficiency	Reciprocity	Envy	0.1566	-690	46 EF	30 RE	10 EN
Efficiency	Reciprocity	Equity	0.1655	-703	46 EF	34 RE	10 EQ
No-disapproval	Reciprocity	Maximin	0.1744	-717	40 ND	40 RE	10 MA
Reciprocity	Maximin	Equity	0.1811	-725	41 RE	36 MA	13 EQ

Table 3: Error rates, Akaike Information Criteria, and the optimal assignment of subjects in the best models of 1, 2, and 3 decision rules (models with more decision rules have a very negative AIC). The following abbreviations are used: ND=No-disapproval, EN=Envy, RE=Reciprocity, EF=Efficiency, EQ=Equity, and MA=Maximin.

commends to achieve efficient outcomes. Further, we observe that other factors like envy and equity play a marginal role in our games. This is somehow surprising: Since abundant evidence suggests that inequity aversion or some kind of egalitarian motives are important to explain monetary punishment (see Fehr and Schmidt 1999, Dawes et al. 2007, and Leibbrandt and Lopéz-Pérez 2008), we expected something similar to happen with non-monetary punishment (*i.e.*, disapproval). It seems however that the causes of monetary and non-monetary punishment are different, a finding to be studied further in the future.

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Exemplary Instructions

Welcome

Dear participant, thank you for taking part in this experiment. It will last about 60 minutes. If you read the following instructions carefully, you can – depending on your decisions – earn some money. The entire of money which you earn with your decisions will paid to you in cash at the end of the experiment. These instructions are solely for your private information.

We will not speak of Euros during the experiment, but rather of ECU (Experimental Currency Units). Your whole income will first be calculated in ECU. At the of the experiment, the total amount you have earned will be converted to Euro at the following rate:

20 ECU = 1 Euro.

In order to ensure that the experiment takes place in an optimal setting, we would like to ask you to abide by the following rules. If you do not obey them, we will have to exclude you from this experiment and you will not receive any compensation.

- Do not communicate with your fellow students. If you have any doubts, raise your hand and one of the experimenters will clarify them privately.
- do not forget to switch off your mobile phone!
- you may take notes on this instruction sheet if you wish.
- when the experiment finishes, remain seated till we pay you off.

The Experiment

In the experiment you will participate in six different scenarios, and you will be paid for your decisions in one scenario, randomly chosen at the end of the experiment. More precisely, the participant playing at the computer number 9 will roll a die and we will pay you the equivalent in Euros of your ECU earning in the scenario corresponding to the number that turns up.

In what follows we will explain to you only the first scenario. Once you made your decision in this first scenario, we will introduce the five remaining scenarios. Note well that each scenario is independent of the others; that is, your payoff in any scenario does not depend on decisions taken in other scenarios.

Scenario 1

In this scenario, you have been randomly and anonymously matched with another participant and both of you have to choose independently between alternative X and alternative Y. Depending on your choices, you will get the following ECU payoff:

- if you both choose X, both of you get 180 ECU.
- if you choose X and the other participant chooses Y, you get 80 ECU and the other participant gets 260 ECU.
- if you choose Y and the other participant chooses X, you get 260 ECU and the other participant gets 80 ECU.
- if you both choose Y, both of you get 100 ECU.

The matrix below summarizes this.

Decisions at this scenario will be private; that is, you will never be informed about the decisions of any other participant in this scenario, and no other participant will know your decision in this scenario. Apart of choosing between X and Y, in this scenario both of you

		The other player	
		X	Y
You	X	(180,180)	(80,260)
	Y	(260,80)	(100,100)

Table 4: Payoff table.

have the possibility to send one message to the other participant with your opinion about her/his choice. Sending a message costs 10 ECU. Since decisions are private, however, you will not know whether the other participant chose X or Y. For this reason, we will ask you whether you want to send message for any possible contingency. More precisely, the procedure will consist of three steps:

1. You will be asked the following question: "Suppose both of you chose X. Do you want to send a message paying a cost of 10 ECU?" You can choose either *Yes* or *No*.

2. Independently of your answer to the previous question, you are then asked the following question: "Suppose you decided to send a message to the other participant in case both of you chose X. Which of the following three messages do you send?"

    - Your choice was good.
    - Your choice was neither good nor bad.
    - Your choice was bad.

3. The same two previous steps are then repeated for any of the other three possible combinations of choices: (X, Y), (Y, X), and (Y, Y).

Observe again that decisions are always private; that is, none of you will know the choices of the other participant when going to the next scenario (including messages). The actual decisions in one scenario will be anonymously revealed to both participants only if, at the end of the experiment, it turns out that this scenario is randomly chosen for payment. If the die selects scenario 1, moreover, each participant will receive the message selected by the other participant at that scenario (step 2) only if the other participant previously chose *Yes* in step 1. Finally, observe that once the first scenario has finished, you will be matched to a different participant for the remaining five scenarios.

Control Questions

Please answer the following control questions. Once you have written down all your answers, please raise your hand so that one of the experimenters can check them.

1. How many different scenarios are there?

2. If you choose X and the other participant chooses X, what will be your payoff?

3. If you choose X and the other participant chooses$Y$, what will be your payoff?

4. Are you always matched with the same participant?

5. How will your final payoff (in Euro) be determined?

Scenarios 2–6

You will be matched throughout the rest of the experiment with a participant different from the one you have been matched with in the first scenario. One of you will be throughout all remaining scenarios a type 1 participant, and the other will be throughout a type 2 participant. Your type will appear soon on the computer screen.

In what follows, we will only explain scenario 2 in detail, since the remaining four scenarios have the same structure. As Figure 1 shows, participant 1 has to decide between two ECU allocations: A and B. Allocation A gives 180 ECU to participant 1 and 140 ECU to participant 2, and allocation B gives 100 ECU to participant 1 and 220 ECU to participant 2.

Participant 1	Participant 2
180	140

Allocation A

Participant 1	Participant 2
100	220

Allocation B

Figure 1: ECU allocations (to be decided by participant 1).

After participant 1 has made her/his decision, participant 2 gets the possibility to send a message to participant 1 with her/his opinion about the choice being made. Sending a message costs 10 ECU to participant 2. Note well, however, that participant 2 will not be informed about the actual decision of participant 1, instead she/he is asked how she/he would react in case participant 1 chose either of the two allocations. More precisely, the procedure will consist of three steps:

1. Player 2 is first asked the following question: "Suppose participant 1 chose allocation A. Do you want to send a message paying a cost of 10 ECU?" Participant 2 can either choose *Yes* or *No*.

2. Independently of the her/his answer to the previous question, participant 2 is then asked

the following question: “Suppose you decided to send a message to the other participant in case she/he chose allocation A. Which of the following three messages do you send?”

- Your choice was good.
- Your choice was neither good nor bad.
- Your choice was bad.

3. The same two previous steps are then repeated with allocation B.

The same procedure applies to the remaining four scenarios, which will differ only in the allocations available to participant 1.

Observe that decisions are always private; that is, neither participant 1 nor participant 2 will know the choices of the other participant when going to the next scenario. The actual decisions in one scenario will be anonymously revealed to both participants only if, at the end of the experiment, it turns out that this scenario is randomly chosen for payment. Further, and if the die selects one of the scenarios 2 to 6, participant 1 will receive the message selected by participant 2 at that scenario (step 2) only if participant 2 previously chose *Yes* in step 1.

An example will clarify these points. Suppose that scenario 2 is selected by the roll of the die at the end of the experiment, and that participant 1 chose allocation A (180/240) in that scenario. The following two things could then happen:

1. If participant 2 decided to send a message, then participant 1 will receive 180 ECU, participant 2 will receive 230 ECU (240 minus the 10 ECU cost for sending the message), and participant 1 will observe the message sent by participant 2.

2. On the other hand, if participant 2 decided not to send a message, then the final payoff would be 180 ECU to participant 1 and 240 ECU to participant 2.

Similarly, if participant 1 chose allocation B (100/220) instead, the final payoff would be 100 ECU to participant 1 and either 220 ECU or 210 ECU to participant 2. The latter would occur if participant 2 decided to send a message after participant 1 chose allocation B.